



Homogenization of daily series: Suitability of additive and multiplicative models and experiences with Climatol 3.0

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Homogenization of daily climatological series is recognized as a difficult task due to their low signal to noise ratio. The most advised methodology so far is to adjust the daily values by interpolating monthly corrections derived from a homogenization at the monthly scale, when the power of break detections is much higher than at the daily scale.

One of the first options to choose when addressing a homogenization is whether to apply an additive or a multiplicative model. Additive models are suggested for temperature and other variables with an approximately normal distribution of probabilities, while the multiplicative model should be used for biased variables with a natural zero, such as precipitation or wind speed. Or at least those are the current procedures indicated in the literature. But sometimes it is not clear which is the most appropriate model to use, and here the suitability of both approaches is checked with a selection of real series of daily data, by studying the coefficients of linear regressions between significantly correlated series in precipitation, wind speed, relative sunshine duration, temperature and relative humidity.

The homogen function of the R package Climatol already allowed the direct homogenization of daily data, but in the new version 3.0 functions to adjust the daily series with monthly correction terms (additive model) or factors (multiplicative model) are also provided. This communication explores both approaches with a small benchmark of real data in which random inhomogeneities are introduced, and then the homogenization experiences with real daily datasets are presented and discussed.